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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/818,575	03/28/2001	Zvi Yona	P-3068-US	3666
27130	7590	11/26/2004	EXAMINER	
EITAN, PEARL, LATZER & COHEN ZEDEK LLP 10 ROCKEFELLER PLAZA, SUITE 1001 NEW YORK, NY 10020			CHANG, AUDREY Y	
			ART UNIT	PAPER NUMBER
			2872	

DATE MAILED: 11/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/818,575

Applicant(s)

YONA ET AL.

Examiner

Audrey Y. Chang

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 14, 2004 has been entered.
2. This Office Action is also in response to applicant's amendment filed on August 16, 2004, which has been entered into the file.
3. By this amendment, the applicant has amended claims 1, 7, 8-10, 17-19, 24, and 27 and has newly added claims 33-38. Applicant is respectfully noted that **claim 7 has been amended** yet it is not amended according to the rule, 37 CFR 1.121.
4. Claims 1-38 remain pending in this application.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
6. Claims 1-7, 9-16 and 18-38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 1, 10 and 19 have been amended to include the feature "a redirecting unit coupled to said image source direct ... to ... spatial regions of a reflecting unit based on said different optical

Art Unit: 2872

property” wherein the optical property is referred in the earlier part of the claims as polarization or wavelength. However the specification and the claims **fail** to teach that the reflecting unit being a *diffractive* optics or a *hologram*, as recited in claims 2-4, 11-13 and 20-23 when the property is polarization. A simple reflective unit is used in the polarized image light. The diffractive optical element and the hologram disclosed in the instant application cannot diffract light based on different polarization state.

The specification and the claims also **fail** to teach that “a redirecting unit” can direct the images to spatial regions of a reflecting unit “**based on said different optical property**” wherein the property being **either** wavelength or polarization. The specification does not teach that the **same** “redirecting unit” is capable of **operating in different mode based on different optical property**. Different optical arrangements are disclosed for wavelength selection and polarization selection yet **not a single redirecting unit** to be operated between the two. The claims suggest that the same unit is capable of operating in the two optical modes is not disclosed and not enabled by the disclosure.

The specification and the claims fail to teach how could the redirecting unit being a *polarization selective* reflective device that is capable of “directing at least said first and second images to at least first and second respective spatial region of a reflecting unit”. Clarifications are required. It is known in the art that a polarization selective reflective device to the most can **only reflect** light with one particular polarization state; it will not be able to **redirect** light along common optical axis, (as required by the amended claims 1, 10 and 19) into *different directions*, unless certain specific structure is designed to do so, and the *specific structure is essential* to enable the function. Furthermore, the polarization selective reflective device can only reflect “polarized light” where no such feature is being defined in the claims for the image, this therefore makes the apparatus not enabling. The applicant is respectfully noted that polarizability is different from reflectivity. Polarizability along will not be able to reflect light of different polarization to different spatial regions.

The specification and claims also fail to teach how could an image source is capable of generation spatial complementary image that are of different wavelength or of different polarization. **Certain essential elements, that are critical, are needed to achieve such features, for instance different image generators for generating different image with different wavelength or polarization coding scheme and a combiner to combine the image. Claims 34 and 36 fail to provide the essential element of coding the two images to have the different wavelength or polarization property.**

The specification and the claim fail to teach how could a wavelength sensitive device can work as the redirecting unit. The claims fail to teach the wavelength property of the images to make the “wavelength sensitive device” workable in the apparatus claimed. The specification and the claims also fail to teach how could it be by simply having “wavelength sensitive” the redirecting unit is capable of directing first and second complementary images to different spatial location, according to wavelength. Color-coding in general will not give different reflection direction.

Clarifications are required.

Claim Objections

7. Claims 25 and 28 are objected to because of the following informalities:

(1). The phrase “the first and second complementary images are substantially non-overlapping” recited in claims 25 and 28 is confusing since it is not clear at where are these two images not overlapping. If they are generated along the *same* optical axis and if they are being viewed by the observer shouldn't they be overlapped?

Appropriate correction is required.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2872

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. **Claims 1-7, 9-16, 18-23, 35 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to patent issued to Preston (PN. 6,094,283).**

Preston teaches a *holographic display* that is comprised of an *image source* (30, Figure 1) to produce at least a *first and second complementary images* along a *common optical axis* wherein the complementary images are differing in *wavelength*, (i.e. the image comprises red, green and blue complementary image). The display further comprises a *relay optics* (32) having a field of view associated with it, a *redirecting unit* (34 and 36) coupled to the image source for directing the complementary images to at least a first and second respective spatial regions of a *reflecting units* (38) *based on the wavelength property* of the complementary images, wherein the images are reflected by the reflecting unit such that a single eye of the observer is capable of viewing **an integrated image** from the complementary images. Preston teaches that the redirecting unit (34 and 36) each comprises a **stack of red, green and blue holograms** (60, 62 and 64) that redirects **only** the red, green and blue component or complementary image, *respectively* which means the redirection is based on wavelength property. The reflecting unit or the eyepiece (38) is also comprised of a **stack** of red, green and blue holograms that are *spatially* separated from each other, (please Figure 7), this means that different wavelength components or complementary images are reflected by different holograms at *different* spatial locations.

This reference has met all the limitations of the claims with the exception that it does not teach *explicitly* that the field of view of the integrated image is wider than the field of view of the relay optics. However this is either *inherently* included in the geometric relationships among the different optical elements as demonstrated by Figure 1 wherein the final integrated image appears to have a greater field of view than the field of view of the relay optics or an obvious modification to one skilled in the art to obtain a wider view, (please see Figure 1 and columns 2-7).

With regard to claims 2-4, 11-13, and 20-23, the reflecting unit or the eyepiece (38) is a diffractive holographic element having optic power for converging the complementary images to form a composite or integrated image. Although this reference does not teach explicitly that the holographic optical element is a binary optics such feature is either inherently met by the disclosure or an obvious modification to one skilled in the art for the benefit of providing an alternatively well known type of diffractive element that have good diffraction efficiency. **Preston** teaches that the image display apparatus could be applied as *head mount display*, (with respect to claim 10 also), which implicitly requires the observer being capable of viewing the surrounding scene also. Although this reference does not teach explicitly to make the power of the holographic optical element to have zero optical power for surrounding scene by providing a corrector hologram, however such practice is standard in the art for the benefit stated above, such modification would therefore have been obvious to one skilled in the art.

With regard to claims 5-6, 14-15, 24, 27, and 31, **Preston** teaches that the number of complementary images is at least three and the images are different in color or wavelength. The reflecting unit (38) is wavelength selective.

With regard to claims 7, 9, 16, 18 and 30, this reference however does not teach explicitly that the complementary images are different in polarization state and the redirecting unit is polarization selective reflecting device. However the instant application fails to provide an operable model using polarization mode in the claims, it therefore cannot be examined with details. It would have been obvious to one skill in the art to make the holograms (60, 62 and 64) polarization selective so that different polarization states of the image light will be redirected and reflected by holographic elements (34, 36 and 38) independently. Polarization selective hologram is very well known in the art.

With regard to claims 25-26, 28-29, 32-33, 35, and 37, **Preston** teaches that the different color components of the image or the complementary images are *simultaneously* generated and they are not overlapping at the eyepiece since different hologram is responsible to reflect a complementary image of

Art Unit: 2872

particular wavelength. Although this reference does not teach that the complementary images can also be generated sequentially, such modification is considered to be an obvious matters of design choice to one skilled in the art for it basically operates the same as simultaneously generation.

10. Claims 34, 36 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Preston as applied to claims 1, 10 and 19 above, and further in view of the patent issued to Chauvin (PN. 5,198,928).

The holographic image display taught by **Preston** as described for claims 1, 10 and 19 above has met all the limitations of the claims. This reference teaches that the images are generated by image source (30) but does not teach explicitly that the images are generated using two image sources and a combiner. However such arrangement is rather well known in the art to generate an combined image with different coding of the image components, as taught by **Chauvin**. **Chauvin** teaches an apparatus to generate an image along a single optical axis wherein the image comprises two image components each of different polarization state, wherein two image sources (22 and 24) are used to generate a pair of image component wherein a pair of polarizes (26 and 28) is used to polarize the image components to have different polarization state and a combiner (30) is used to combine the two image components, (please see Figure 1). It would then have been obvious to one skilled in the art to apply the teachings of Chauvin to modify the image source for the benefit of generating the image with different coding of each image components.

11. Claims 8 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Florence et al (PN. 5,652,666).

Florence et al teaches a *holographic display system* that is comprised of a *spatial light modulator* (14, Figure 4), for generating a *plurality of stripes of image* representing a hologram, that serves as the *at*

Art Unit: 2872

least first and second complementary images, with no significant portions being overlapped with each of the stripe of images, (please see Figure 4). The display system further comprises a set of lenses (41-43) serves as the **relay optics** with associated field of view for directing the complementary images to a scanning mirror (45) that is rotatable for redirecting the stripes of image to a *cylindrical lens* (44) to form **an integrated hologram image** at an image plane (46). This reference has met all the limitations of the claims with the exception that it does not teach explicitly to use a reflecting unit as the means for forming the integrated image. However to use a transparent lens or a reflective mirror for converging image light to form image is rather well known in the art such modification would have been obvious to one skilled in the art for the benefit of providing a different and more compact optical design to the display system.

Response to Arguments

12. Applicant's arguments with respect to claims 1-38 have been considered but are moot in view of the new ground(s) of rejection. The newly amended claims and newly added claims have been fully considered and they are rejected for the reasons stated above.

13. Applicant's arguments are mainly based on the newly amended and newly added claims and they have been fully addressed in the paragraphs above. The applicant is respectfully reminded that the strips of holograms generated by the DMD **together** form a *composite* hologram image to be viewed by a single eye of an observer.

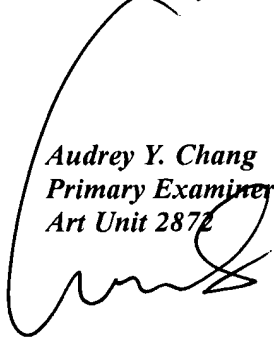
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2872

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Audrey Y. Chang
Primary Examiner
Art Unit 2872



A. Chang, Ph.D.